

23rd Canberra International Physics Summer School, 1-5 Dec 2014.
Australian National University

Preliminary program.

Monday, December 1

(Lecture hall STB_S1, Bldg 136)

08:30 - 09:30 **Registration, tea & coffee**

09:30 - 09:35 **Summer School opening.** *Professor Ian Young, Vice-Chancellor ANU.*

09:35 - 10:30 **Keynote Lecture: TBA**

Professor Brian Schmidt, Nobel Prize Laureate, ANU

10:30 - 11:00 **Break: Morning tea**

11:00 - 12:00 **Invited lecture: Opportunities and challenges in Nanotechnology**

Professor Paul Mulvaney (University of Melbourne)

(Lectures will continue in room STB_S1, Bldg 136)

14:00 - 15:00 **Lecture 3. Synchrotron based analysis of nano-materials** *(introduction into synchrotron radiation techniques with a particular example of x-ray absorption spectroscopy)*

A/Professor Patrick Kluth, ANU

15:00 - 15:30 **Tea Break**

15:30 - 16:30 **Lecture 4 Manipulation of materials at the nanoscale** *(top-down and bottom-up approaches to nano-structure formation and manipulation)*

Dr. Fouad Karouta, ANU

(walk to Oliphant Building #60, Mills Road)

16:30 - 17:00 **Tea Break**

17:00 - 18:00 **Tours of the Australian National Fabrication Facility ANFF**

Tuesday, December 2,

(Manning Clark Theatre 1, Bldg. 26A)

08.30 - 10.00 **Keynote lecture: Silicon tandem solar cells: Potential of Perovskites and other Non-conventional Materials,**

Professor Martin Green (UNSW)

(Lectures will continue in room STB_S1, Bldg 136)

10:00-10:30 **Tea Break**

10:30-11:30 **Invited lecture: Nonlinear Photonics and Metamaterials,**

Professor Yuri Kivshar, ANU

11:30-11:40 **Short break, informal discussions**

11:40-12:15 **Nonlinear optics: frequency conversion and quantum circuits,**

A/Prof. Andrey Sukhorukov, ANU

12:15-13:45 **Lunch break, informal discussions**

13:45-14:30 **Invited lecture: Rogue waves,**

Professor Nail Akhmediev, ANU

23rd Canberra International Physics Summer School, 1-5 Dec 2014.
Australian National University

14:30-14:40 **Short break, informal discussions**

14:40-15:15 **Nonlinear matter waves: Bose-Einstein condensation,**

Dr. Elena Ostrovskaya, ANU

15:15-15:45 **Walk to RSPE, tea and discussions at RSPE**

15:45-17:00 **Lab Tours rotation**

Wednesday 3 Dec

(Lecture hall STB_S1, Bldg 136)

9:00 -10:00 **Keynote lecture: TBA**

Professor Alex Zelinsky, Chief Defence Scientist, to be introduced by

Professor Ian Young, Vice-Chancellor ANU.

10:00-10:30 **Tea Break**

10:30-11:30 **Physics of quantum many-body systems**

Dr. Cedric Simenel, ANU

11:30-12:30 **Tunnelling in heavy-ion fusion**

Professor Mahananda Dasgupta, ANU

12:30-14:00 **Lunch**

(Research School of Physics & Engineering, Oliphant Bldg. #60)

14:00-14:30 **Tour of the Heavy-Ion Accelerator / Quantum Simulation**

Dr. Gregory Lane and Dr. Cedric Simenel, ANU

14:30-15:30 **First rotation(*)**

15:30-16:00 **Tea Break** *(Oliphant Bldg, #60)*

16:00-17:00 **Second rotation(*)**

() The students will be divided in two groups. One group will do some lab activities with G. Lane. The other group will do some quantum simulations with C. Simenel.*

Thursday 4 December

(Lecture hall STB_S1, Bldg 136)

9:00 – 10:00 **What is entanglement? From EPR to quantum information.**

Dr. André Carvalho, ANU

10:00 – 11:00 **Entanglement as a resource: how much is enough?**

Dr. André Carvalho, ANU

11:00-11:30 **Tea break**

11:30-12:15 **Continuous variable entanglement and teleportation**

Dr. Ben Buchler

23rd Canberra International Physics Summer School, 1-5 Dec 2014.
Australian National University

12:15-1:30 **Lunch**

13:30-14:15 **Quantum Geometry**

Prof. Vladimir Bazhanov, ANU

14:15-14:30 **Presentation of prizes for Mathematical Physics Quiz**

14:30-15:30 **Lab tours: Department of Quantum Science**

15:30-16:00 **Tea break**

16:00-16:20 **Tests of quantum entanglement with matter waves**

Dr. Andrew Truscott, ANU

16:20-16:40 **Quantum entanglement in gravitational wave detectors: quantum behaviour of massive objects.** *Dr. Andrew Wade*

16:40-17:00 **How to send secret messages: Quantum cryptography**

Dr. Sayed Assad, ANU

Friday 5 December

(Manning Clark Theatre 1, Bldg. 26A)

08.30 - 10.00. Keynote Lecture: Solar Energy in a Sustainable World

Professor Steven Chu, Nobel Prize Laureate & former Energy Secretary of the United States

(Lectures will continue in room STB_S1, Bldg 136)

10:00-10:30 **Tea Break**

10:30-11:20 **Making a star on Earth: progress and prospects for fusion power**

A/Prof. Matthew Hole, ANU

11:30-12:30 **Invited Lecture: Addressing the needs of ITER: Tokamak physics at the cutting edge**

Dr. Raffi Nazikian, Princeton Plasma Physics Laboratory, US

12:30-14:00 **BBQ Lunch** *(Oliphant Bldg, #60)*

(Lectures will continue in Huxley Lecture Theatre, Bldg 56)

14:00-15:00 **3D fields: complex geometry, experiments and diagnostics**

Dr Clive Michael, ANU / Dr Raffi Nazikian, Princeton Plasmas Physics Laboratory, US

15:00-15:30 **Tea Break** *(Oliphant Bldg, #60)*

15:30-16:20 **Extreme materials at the plasma-surface frontier**

Dr. Cormac Corr, ANU

16:20-18:00 **Lab tours**